per cent. soluble pyroxylin, thirty per cent. potassium nitrate, 7.2 per cent. wood-meal; total, one hundred per cent.

b. 38.4 per cent. dinitroglycerin, 25.6 per cent. blasting-oil, (trinitroglycerin,) 1.7 per cent. soluble pyroxylin, twenty-seven per cent. sodium nitrate, 7.3 per cent. wood-meal; total, one hundred per cent.

c. Seventeen per cent. dinitroglycerin, fifty-eight per cent. blasting-oil, twenty-three per cent. infusorial earth, (kieselguhr,) two per cent. chalk; total, one hundred per cent.

d. Fifty per cent. dinitroglycerin, forty-nine per cent. soluble pyroxylin, one per cent. diphenylamin; total, one hundred per cent.

e. Twenty per cent. dinitroglycerin, eighty per cent. soluble pyroxylin; total, one hundred per cent.

f. Forty per cent. dinitroglycerin, ten per cent. blasting-oil, forty-nine per cent. soluble pyroxylin, one per cent. diphenylamin; total, one hundred per cent.

g. Twelve per cent. dinitroglycerin, eight per cent. trinitroglycerin, seventy-nine per cent. nitro-starch, one per cent. diphenylamin; total, one hundred per cent.

h. 7.5 per cent. dinitroglycerin, 42.5 per cent. trinitroglycerin, forty-nine per cent. soluble pyroxylin, one per cent. diphenylamin; total, one hundred per cent.

i. Forty-five per cent. dinitroglycerin, thirty per cent. trinitroglycerin, two per cent. chalk, twenty-three per cent. infusorial earth, (kieselguhr;) total, one hundred per cent.

k. Forty-one per cent. dinitroglycerin, thirty-four per cent. trinitroglycerin, one per cent. chalk, twenty-four per cent. infusorial earth, (kieselguhr;) total, one hundred per cent.

l. Fourteen per cent. dinitroglycerin, seventy-eight per cent. trinitroglycerin, eight per cent. soluble pyroxylin; total, one hundred per cent.

m. 12.5 per cent. dinitroglycerin, 62.5 per cent. trinitroglycerin, one per cent. chalk, twenty-four per cent. infusorial earth, (kieselguhr;) total, one hundred per cent.

As an example of my method of manufacturing dinitroglycerin I may cite the following: To ten parts, by weight, of glycerin of 1.262 specific gravity thirty-three parts, by weight, of nitric acid of 1.50 specific gravity are added, preferably by allowing the nitric acid to slowly flow into the glycerin while being stirred, (the temperature being kept down.) The mixture, chiefly mono-nitroglycerin, is now allowed to cool for some time (it may be several hours) until the mono-nitroglycerin is converted into dinitroglycerin. Said conversion may be accelerated by the use of dehydrating salts or the like, as is well known to those skilled in the art. The entire mass is then diluted with about ten parts, by weight, of cold water and the nitric acid neutralized by a suitable agent until the lye—for example, in case of using carborate of lime for neutralization—has a specific gravity of 1:58. The dinitroglycerin rises therein and can be readily separated, purified, and dried. Any dinitroglycerin which may remain in the lye can be readily removed by means of a solvent, such as ether, and obtained from the latter by distillation. If desired, the mixture of oil and lye deprived of acid can be treated in the same manner without prior separation, no technical difficulties being presented.

Dinitroglycerin is obtained as a colorless oil when the glycerin and the nitric acid are colorless—that is to say, free from impurities. It is soluble in water to a large extent, and by reason of this property can very well be obtained quite pure—for instance, by fractional evaporation of the water. The well-known solvents for nitroglycerin also readily absorb dinitroglycerin. The percentage of nitrogen according to calculation is 15.38. An actual analysis (nitrometer and organic analysis) showed the average to be 15.38 per cent.

If mixtures of dinitroglycerin with trinitroglycerin are employed for manufacturing explosives or gunpowder, the dinitrin and trinitrin can first be prepared separately and then mixed. If, however, from nitric acid and sulfuric acid a suitable mixture of certain nitrifying efficiency or nitration value is made, said mixture may be used for preparing and obtaining direct a mixture of both the trinitroglycerin and the dinitroglycerin—*i. e.*, a mixture containing the desired percentage of dinitroglycerin.

On the percentage of di and tri nitroglycerin in the product, in addition to the concentration and proportion of the two acids, the temperature and the duration of nitrification exert an influence, as well known in the case of nitrifications generally.

With this method of working, therefore, the separated oil consists of di and tri nitroglycerin. A considerable part of the nitrated glycerin remains dissolved in the waste acid and can by the addition of further acid mixture, concentrated sulfuric acid, or other dehydrating agent be separated from it in the form of an oil consisting partly or wholly of trinitroglycerin.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The process of manufacturing dinitroglycerin which consists in reacting on glycerin with nitric acid, maintaining a low temperature until dinitroglycerin is formed and neutralizing the excess of acid, as set forth.

2. The process of manufacturing dinitroglycerin which consists in reacting on glycerin with nitric acid, maintaining a low tempera-